U.S. Department of Transportation
United States Coast Guard

Commandant
United States Coast Guard

2100 Second St, S.W.
Washington, DC 20593-0001
(202) 267-2963

COMDTINST 5100.48A
14 MAR 1994

COMMANDANT INSTRUCTION 5100.48A

Subj: SHORE CONFINED SPACE ENTRY

1. PURPOSE. This instruction describes policy and procedures for administration of the Coast Guard Confined Space Entry Program. A confined space is defined as a space that: is large enough and so configured that an employee can bodily enter and perform assigned work; has limited or restricted means for entry or exit (e.g., tanks, vessels, storage bins, vaults, and pits are spaces that may have limited means of entry); and is not designed for continuous employee occupancy. Intended users are all shore units with confined space work environments.

2. ACTION. Area and district commanders; commanders, maintenance and logistics commands; commanding officers of Headquarters units; Commander, Coast Guard Activities Europe; and chiefs of offices and special staff divisions at Headquarters shall ensure compliance with the provisions of this instruction.

3. DIRECTIVES AFFECTED. Confined Space Entry Manual, COMDTINST M5100.48, is cancelled.

4. SCOPE.

   a. This instruction adopts the use of 29 CFR 1910.146 as the guidance for Coast Guard military and civilian personnel and supervisors who have the potential to work on or enter into confined spaces, or work in support of shore-related confined space operations. This includes marinas where Coast Guard personnel work.

b. Civilian contractors working on Coast Guard facilities shall comply with 29 CFR 1910.146. These requirements shall be included in the contract. Utility contractors are covered by 29 CFR 1926.956. Electrical utility contractors are covered by 29 CFR 1910.268.

c. This instruction does not apply to floating units (vessels), boarding parties, commercial shipyards, and shipyards where vessels greater than 65 feet in length and are hauled out of the water for repair. For example, a ship being cleaned or welded at a dock at Coast Guard Yard would follow 29 CFR 1915 procedures and be exempt from this instruction. Vessels afloat shall follow the Navy Ships Technical Manual, S9086-CH-STM-032.

d. Marine safety units who work on small boats shall follow the procedures in Marine Safety Manual, Vol. I, COMDTINST M16000.6(series).

e. In shipyard or ship repair situations the provisions of 29 CFR 1915.14a or 46 CFR 91.50 may apply. Questions pertaining to these infrequent events should be directed to the cognizant MLC or Commandant (G-MTH). In accordance with these regulations the Coast Guard Officer in Charge, Marine Inspection may designate an entry supervisor to issue permits in the absence of a marine chemist.

f. Air stations that conduct inspection and repair of aircraft integral tanks and cells shall follow the provisions of COMDTINST M13020.1(series) and NAVAIR 01-1A-35. Aircraft maintenance procedure cards include adequate guidance for confined space entry requirements and will be used. Note that the entry authority in NAVAIR 01-1A-35 will perform functions similar to the entry supervisor in 29 CFR 1910.146.

5. DISCUSSION. This directive implements the Coast Guard's adaptation of 29 CFR 1910.146. The 14 January 1993 version of 29 CFR 1910.146 has been revised, effective 29 June 1993, in the Federal Register. With appropriate training, 29 CFR 1910.146 can be used by units to set up the local permit-required confined space entry program and the unit non-permit-required confined space entry program. The unit commanding officer may designate an individual to manage the confined space entry program. Any individual formerly designated as a competent person, qualified person, gas-free engineer, industrial hygienist, safety specialist, or other technically trained individual in accordance with 29 CFR 1910.146 (g)(1) may be assigned the responsibilities of an entry supervisor. Training requirements for all other participants in the unit confined space entry program are also covered in 29 CFR 1910.146 (g)(1). Local training sources shall be able to provide training in accordance with 29 CFR 1910.146.

6. GENERAL REQUIREMENTS. The unit commanding officer shall designate an individual to manage the unit confined space entry program and carry out the following duties:

   a. Identify and evaluate permit-required confined spaces;

   b. Inform employees who are exposed to permit-required spaces of the existence, location, and the danger posed in permit spaces. Posting a danger sign reading "DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" or other similar language is an acceptable means of informing exposed employees;

   c. Prevent unauthorized entry into permit spaces by locking, tagging and/or posting;

   d. Implement a written permit-required confined space entry program for authorized entry;

   e. Reevaluate a space when there are changes in the use or configuration of a non-permit-required confined space that might increase the hazards to entrants, and, if necessary, reclassify it as a permit-required confined space;

   f. Reclassify a non-permit-required confined space when changes in the use or configuration of a permit confined space decrease the hazards to entrants, if:

      (1) Testing and inspection demonstrate that the permit space poses **no actual or potential atmospheric hazard** for as long as hazards within the space remain eliminated (note: if forced air ventilation is used this does not apply);

      (2) Documented proof that the space is safe is made available to each employee entering the space. Document should include date, the location of the space, and the signature of the person making the determination;

   g. As part of the contract, ensure contractors are responsible for:

      (1) Making their employees aware of workplace confined spaces;

      (2) Establishing a permit space program meeting the requirements of this instruction;

      (3) Obtaining experience with the conditions and confined work space(s) prior to the start of work;

(4) Obtaining Coast Guard precautions or procedures implemented for the protection of Coast Guard employees working in or near permit spaces where contractor personnel will be working;

(5) Coordinating entry operations with Coast Guard competent person, qualified person or other designated Coast Guard individual on site to prevent Coast Guard personnel and contractor personnel endangering each other; and

(6) Debriefing each other (Coast Guard and contractor), at the conclusion of the entry operations regarding the permit space program followed and regarding hazards confronted or created in permit spaces during entry operations.

7. UNIT PERMIT-REQUIRED CONFINED SPACE PROGRAM. Once the unit commanding officer/OIC determines that the unit needs a confined space entry program, an individual shall be designated, to implement the permit-required confined space program at the unit. This individual may be an entry supervisor or entry authority. This individual shall:

a. Implement the measures necessary to prevent unauthorized entry;

b. Identify and evaluate the hazards of permit spaces before employees enter them;

c. Develop and implement the means, procedures, and practices necessary for safe permit space entry operations, including, but not limited to, the following:

(1) Specifying acceptable entry conditions;

(2) Isolating the permit space;

(3) Purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards;

(4) Providing pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards; and

(5) Verifying that conditions in the permit space are free from hazards of energy sources, loose materials, entrapment, deteriorated ladders, and atmospheric hazards etc., throughout the duration of the authorized entry.

d. Provide the following equipment at no cost to employees, maintain that equipment properly, and ensure that employees use that equipment properly:

(1) Testing and monitoring equipment;

(2) Ventilating equipment;

(3) Communications equipment;

(4) Personal protective equipment in situations where feasible engineering and work practice controls would not adequately protect employees;

(5) Lighting equipment to enable employees to see well enough to work safely and to exit the space quickly in an emergency;

(6) Barriers and shields;

(7) Equipment, such as ladders, needed for safe entering and exiting by authorized entrants;

(8) Rescue and emergency equipment (unless the equipment is provided by rescue services); and

(9) Any other equipment necessary for safe entry into and rescue from permit spaces.

e. Evaluate permit space conditions as follows when entry operations are conducted:

(1) Test conditions in the permit space to determine if acceptable entry conditions exist before entry is authorized to begin, unless isolation of the space is feasible because the space is large or is part of a continuous system (such as a sewer), pre-entry testing shall be performed to the extent feasible before entry is authorized and, if entry is authorized, entry conditions shall be continuously monitored in the areas where authorized entrants are working;

(2) Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations; and

(3) When testing for atmospheric hazards, test first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors and residue.

Note: Atmospheric testing conducted in accordance with Appendix B to 1910.146 would be considered as satisfying the requirements of this paragraph. For permit space operations in sewers, atmospheric testing conducted in accordance with Appendix B, as supplemented by Appendix E to 1910.146, would be considered as satisfying the requirements of this paragraph.

f. Provide at least one attendant outside the permit space, where entry is authorized, for the duration of the entry operation;

Note: Attendants may be assigned to monitor more than one permit space or stationed at any location outside the space provided their duties and communications can be maintained for all permit space that are monitored.

g. If multiple spaces are to be monitored by a single attendant, include in the permit program the means and procedures to enable the attendant to respond to an emergency affecting one or more of the permit spaces without a disruption of the attendant's monitoring capability of either space;

h. Designate the persons who are to have active roles (as, for example, authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in a permit space) in entry operations, identify the duties of each such employee, and provide each such employee with the training required by this instruction;

i. Develop and implement procedures for summoning rescue and emergency services, for rescuing entrants from permit spaces, for providing necessary emergency services to rescued employees, and for preventing unauthorized personnel from attempting a rescue;

j. Develop and implement a system for the preparation, issuance, use, and cancellation of entry permits;

k. Develop and implement procedures to coordinate entry operations when employees of more than one employer are working simultaneously as authorized entrants in a permit space, so that employees of one employer do not endanger the employees of any other employer;

l. Develop and implement procedures (such as closing off a permit space and canceling the permit) necessary for concluding the entry after entry operations have been completed;

m. Review and revise local entry operations before allowing authorized entry to continue when there is some indication that the existing permit space program may not adequately protect employees, and

Note: Examples of circumstances requiring the review of the permit-required confined space program are: any unauthorized entry of a permit space, the detection of a permit space hazard not covered by the permit, the detection of a condition prohibited by the permit, the occurrence of

(cont'd) and injury or near-miss during entry, a change in the use or configuration of a permit space, and employee complaints about the effectiveness of the program.

n. Evaluate the permit-required confined space program by reviewing retained canceled permits 1 year after each entry, revising the program as necessary, and ensuring employees in entry operations are protected from permit space hazards.

Note: The individual designated to administer the local confined space entry program may perform a single annual review covering all entries performed during a 12-month period. If no entry is performed during a 12-month period, no review is necessary. Appendix C to 1910.146 presents examples of permit entry programs.

8. PERMIT PROCESS. An entry supervisor designated by the unit commanding officer shall administer the confined space entry program and shall identify/evaluate permit-required and non- permit-required confined spaces. Based upon acceptable inspection results, a permit may be issued by the entry supervisor. The entry permit (see Enclosure (2)) documents authorized entry to a permit space. The permit identifies:

a. The permit space to be entered;

b. The purpose of the entry;

c. The date and the authorized duration of the entry permit;

d. The authorized entrants within the permit space, by name or by such other means (for example, through the use of rosters or tracking systems) to be used by the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrants are inside the permit space;

Note: This requirement is incorporated into Enclosures (1) and (2).

e. The personnel, by name, currently serving as attendants;

f. The individual, by name, currently serving as entry supervisor, with a space for the signature or initials of the entry supervisor who originally authorized entry;

g. The hazards of the permit space to be entered;

h. The measures used to isolate the permit space and to eliminate or control permit space hazards before entry;

Note: Those measures can include the lockout or tagging of equipment and procedures for purging, inerting, ventilating, and flushing permit spaces.

i. The acceptable entry conditions;

j. The results of initial and periodic tests accompanies by the names or initials of the testers and by an indication of when the tests were performed;

k. The rescue and emergency services that can be summoned and the means (such as the equipment to use and the numbers to call) for summoning those services;

l. The communication procedures used by authorized entrants and attendants to maintain contact during the entry;

m. Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment;

n. Any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety; and

o. Any additional permits, such as welding permits, that have been issued to authorize work in the permit space.

9. TRAINING. Training shall be provided so that all employees involved in entry into confined spaces acquire the understanding, knowledge, and skills necessary for the safe performance of the duties. Contact appropriate MLC (k) for training sources.

a. This training shall be provided:

(1) Before the employee is assigned duties;

(2) Before there is a change in assigned duties;

(3) Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained;

(4) Whenever the entry supervisor believe that employees have deviated from permit space entry procedures intentionally or because of a lack of knowledge of procedures.

b. The training shall aid in establishing employee proficiency in their assigned duties and shall introduce new or revised procedures, as necessary. Courses on confined space entry include MLC-sponsored courses, contracted courses, or any of the following:

(1) Confined Space Safety (SO-240) (formerly OSH-245E), Naval Safety School, Commanding Officer, Naval Safety School, Bldg. SP-17, NAS Norfolk, VA; no fee; POC 804-445-8778 (8 day course).

(2) Confined Space Entry (Course No. OSHATI-226) (previous respiratory protection training required), OSHA Training Institute, Des Plaines, Illinois; no fee; POC 708-297-4913 (2 week course).

(3) Introduction to Competent Persons Program (Course No. OSH 520), OSHA Training Institute, Des Plaines, Illinois; no fee; POC 708-297-4913.

(4) Competent Persons Training Program, National Fire Protection Association (course offered at different sites); fee $350; POC 617-770-3000 (3 day course).

(5) Confined Space Safety (Course No. SO 240), OSHA Training Institute, Des Plaines, Illinois; no fee; POC 708-297-4913.

(6) Confined Space Entry (Course No. OSHATI-226A, OSHA Training Institute, Des Plaines, Illinois; no fee; POC 708-297-4913 (1 week compressed course).

(7) Marine Safety Schools at Reserve Training Center Yorktown.

c. The unit commanding officer or designee shall ensure that employees trained as required above in paragraphs 9.a. and 9.b. have documented a completion of training certificate that includes employee's name, the dates of training, and the signatures or initials of the trainers. This documentation shall be available for inspection by employees or their authorized representatives.

10. DUTIES OF AUTHORIZED ENTRANTS. The unit commanding officer or designee shall provide training that will ensure that authorized entrants:

a. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

b. Know how to use testing and monitoring equipment, ventilating equipment, communications equipment, personal protective equipment, lighting, barriers and shields, ladders, rescue and emergency equipment, and any other equipment needed for safe entry and rescue;

c. Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space;

d. Alert the attendant whenever:

(1) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or

(2) The entrant detects a prohibited condition.

e. Exit from the permit space as quickly as possible whenever:

(1) An order to evacuate is given by the attendant or the entry supervisor,

(2) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation,

(3) The entrant detects a prohibited condition, or

(4) An evacuation alarm is activated.

11. DUTIES OF ATTENDANTS. The unit commanding officer or designee shall ensure that attendants are trained to:

a. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

b. Be aware of the possible behavioral effects of hazard exposure on authorized entrants;

c. Continuously maintain an accurate count of authorized entrants in the permit space and ensure that the means used to identify authorized entrants accurately identifies who is in the permit space;

d. Remain outside the permit space during entry operations until relieved by another attendant;

Note: This permit entry program allows the attendant to enter a permit space to attempt a rescue if they have been trained and equipped for rescue operations AFTER they have been relieved by another trained attendant.

e. Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space;

f. Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and order the authorized entrants to evacuate the permit space immediately under any of the following conditions:

(1) If the attendant detects a prohibited condition;

(2) If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;

(3) If the attendant detects a situation outside the space that could endanger the authorized entrants; or

(4) If the attendant cannot effectively and safely perform all the duties required in this paragraph;

g. Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards;

h. Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:

(1) Warn the unauthorized persons that they must stay away from the permit space;

(2) Advise the unauthorized persons that they must exit immediately if they have entered the permit space;

(3) Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;

i. Perform non-entry rescues as specified by the local rescue procedure; and

j. Perform no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

12. DUTIES OF ENTRY SUPERVISORS. The unit commanding officer or designee shall ensure sufficient training is provided to ensure that each entry supervisor:

a. Knows the hazards that may be faced during entry, including information of the mode, signs or symptoms, and consequences of the exposure;

NOTE: MLC safety staffs can provide information on training sources (competent person and gas-free engineering training).

b. Verifies, by checking that the appropriate entries have been made on Enclosures (1) or (2), that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;

c. Terminates the entry and cancels the permit as required;

d. Verifies that rescue services are available and that the means for summoning them are operable;

e. Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations; and

f. Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

13. RESCUE AND EMERGENCY SERVICES.

a. The following requirements apply to unit commanding officers or designees who have employees enter permit spaces to perform rescue services.

(1) The unit commanding officer or designee shall ensure that each member of the rescue service is provided with, and is trained to use properly, the personal protective equipment and rescue equipment necessary for making rescues from permit spaces.

(2) Each member of the rescue service shall be trained on all types of entries at the unit. Each member of the rescue service shall also receive the training required of authorized entrants.

(3) Each member of the rescue service shall practice making permit space rescues at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit spaces or from representative permit spaces. Representative permit spaces shall, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.

(4) Each member of the rescue service shall be trained in basic first-aid and in cardiopulmonary resuscitation (CPR). At least one member of the rescue service holding current certification in first aid and in CPR shall be available.

b. When the unit commanding officer or designee arranges to have persons other than Coast Guard employees (contract rescue service) perform permit space rescue, the unit commanding officer or designee shall:

(1) Inform the rescue service of the hazards they may confront when called on to perform rescue at the Coast Guard facility.

(2) Provide the rescue service with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.

(3) Facilitate non-entry rescue by use of retrieval systems or non-entry methods whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems shall meet the following requirements:

(a) Each authorized entrant shall use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, or above the entrant's head. Wristlets may be used in lieu of the chest or full body harness if the employer can demonstrate that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative.

(b) The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve personnel from vertical type permit spaces more than 5 feet deep.

(4) If an injured entrant is exposed to a substance for which a Material Safety Data Sheet (MSDS) or other similar written information is required to be kept at the worksite, that MSDS or written information shall be made available to the medical facility treating the exposed entrant.

/s/ ALAN M. STEINMAN
Chief, Office of Health and
Safety

Encl: (1) Confined Space Entry Checklist
(2) Sample Coast Guard Entry Permits

Appendix: 29 CFR 1910.146 excerpts

Enclosure (1) to COMDTINST 5100.48A

CONFINED SPACE ENTRY CHECKLIST

YES/ NO

___/ ___ Is entry necessary?

TESTING

___/ ___ Are the instruments used in atmospheric testing in proper calibration?

___/ ___ Was the atmosphere in the confined space tested?

Combustible gas indicator calibration results:

_____

Oxygen detector calibration results:

_____

___/ ___ Is oxygen level between 20 and 21 percent?

___/ ___ Are toxic, flammable, or oxygen-displacing gases or vapors present?

Carbon Monoxide _____ Hydrogen Sulfide _____

Others: (list)_____

_____

MONITORING

___/ ___ Is the atmosphere in the space being monitored while work is going on? (THIS IS NOT A MATTER OF CHOICE-MONITORING MUST OCCUR).

___/ ___ Continuously?

___/ ___ Periodically? (If yes, enter interval:_____)

Note- ATMOSPHERIC CHANGES MAY OCCUR DUE TO THE WORK PROCEDURE OR THE PRODUCT STORED. THE ATMOSPHERE MAY BE SAFE WHEN YOU ENTER, BUT CAN BECOME UNSAFE VERY QUICKLY.

CLEANING

___/ ___ Has the space been cleaned before entry is made?

___/ ___ Was the space steamed?

___/ ___ If so, was the space allowed to cool?

CONFINED SPACE ENTRY CHECKLIST (continued)

YES/ NO

VENTILATION

___/ ___ Has the space been ventilated before entry?

___/ ___ Will ventilation be continued during entry?

___/ ___ Is the air intake for the ventilation system located in an area that is free of combustible dusts and vapors and toxic substances?

___/ ___ If atmosphere was found unacceptable and the space ventilated, was it re-tested before entry?

ISOLATION

___/ ___ Has the space been isolated from other systems?

___/ ___ Has electrical equipment been locked out?

___/ ___ Have disconnects been used where possible?

___/ ___ Has mechanical equipment been blocked, chocked, and disengaged where necessary?

CLOTHING/EQUIPMENT

___/ ___ Is special clothing required (boots, chemical suits, glasses, respirator, etc.)? If so, specify.

_____

_____

_____

_____

___/ ___ Is special equipment required (e.g., rescue or communications equipment)? If so, specify.

_____

_____

_____

_____

___/ ___ Are special tools required (e.g., spark-proof)? If so, specify.

_____

_____

_____

_____

___/ ___ Can you get through the opening with a respirator on? (Entrants shall actually perform this.)

CONFINED SPACE ENTRY CHECKLIST (continued)

YES/ NO TRAINING

___/ ___ Have workers been trained in proper use of a respirator?

___/ ___ Have workers received first aid/CPR training?

___/ ___ Have workers been trained in confined space entry?

ATTENDANT

___/ ___ Does the attendant remain outside the space and prevent unauthorized entry.

___/ ___ Will the attendant have constant visual or auditory communications with the person on the inside?

___/ ___ Do attendants know how to summon rescue teams in the event of an emergency?

___/ ___ Will attendant use safety lines and harness to remove a person?

___/ ___ Are rescue procedures available to be followed in the event of an emergency?

___/ ___ Has a confined space entry permit been issued?

___/ ___ Does the permit include a list of emergency telephone numbers? Use Enclosure (1) or (2).

ENTRANTS

NAME TIME IN TIME OUT DATE

_____

_____

_____

_____

_____

_____

_____

_____

_____
Signature of Entry Supervisor

LOCAL EMERGENCY TELEPHONE NUMBERS

_____
Confined Space Rescue Team

_____
Fire Department

_____
Ambulance

_____
Hospital

_____
Poison Control

_____
Other Numbers

_____

OTHER TELEPHONE NUMBERS

MLC Atlantic Safety and Environmental Health Staff.
212-668-7156.

MLC Pacific Safety and Environmental Health Staff.
415-437-5928.

Chemical Transportation Emergency Center (CHEMTREC). A toll-free number, 800-424-9300, is manned around the clock by the Chemical Manufacturers Association in Washington, DC. Response information is provided for any chemical transportation emergency.

National Response Center (NRC). A toll-free number, 800-424-8802, is manned around the clock by personnel at Coast Guard Headquarters for spills and environmental release of contaminants.

Coast Guard Headquarters. Flagplot 202-267-2100.

SAMPLE COAST GUARD ENTRY PERMIT, EXAMPLE 1
(Adopted from 29 CFR 1919.146 dated 29 June 1993, Appendix D-1)

Date & Time Issued: _____

Job Site/Space I.D.: _____

Equipment to be Worked On: _____

Date and Time Expires: _____

Standby Personnel: _____

Job Supervisor: _____

Work to be Performed: _____

1. Atmosphere checks:
   Time _____
   Oxygen _____%
   Explosive _____% L.F.L.
   Toxic _____PPM

2. Tester's signature: _____

3. Source isolation (No Entry):

	N/A	Yes	No
Pumps or lines blinded, disconnected, or blocked	( )	( )	( )

4. Ventilation modification:

	N/A	Yes	No
Mechanical	( )	( )	( )
Natural ventilation only	( )	( )	( )

5. Atmospheric check after isolation and ventilation:
   Oxygen _____% > 19.5%
   Explosive _____% L.F.L. < 10%
   Toxic _____% PPM < 10% PPM H2S
   Time _____

   Testers signature: _____

6. Communications procedures: _____

   _____

7. Rescue procedures: _____
   _____
   _____
   _____
   _____
   _____

8. Entry, stanby, and backup persons:

	Yes	No
Successfully completed required training?	( )	( )
Is it current?	( )	( )

9. Equipment:	N/A	Yes	No
Direct reading gas monitor – tested	( )	( )	( )
Safety harnesses and lifelines for entry and standby persons	( )	( )	( )
Hoisting equipment	( )	( )	( )
Powered communications	( )	( )	( )
SCBA's for entry and standby persons	( )	( )	( )
Protective clothing	( )	( )	( )
All electric equipment listed Class I, Division I, Group D and non-sparking tools	( )	( )	( )

10. Periodic atmospheric tests:

Oxygen%	_____%	Time	_____	Oxygen	_____%	Time	_____
Oxygen%	_____%	Time	_____	Oxygen	_____%	Time	_____
Explosive	_____%	Time	_____	Explosive	_____%	Time	_____
Explosive	_____%	Time	_____	Explosive	_____%	Time	_____
Toxic	_____%	Time	_____	Toxic	_____%	Time	_____
Toxic	_____%	Time	_____	Toxic	_____%	Time	_____

We have reviewed the work authorized by this permit and the information contained herein. Written instructions and safety procedures have been received and understood. Entry cannot be approved if any items are marked in the "No" column. This permit is not valid unless all appropriate items are completed.

Permit prepared by (Supervisor):

_____ _____
(printed name) (signature)

Approved by (Unit Supervisor):

_____ _____
(printed name) (signature)

Reviewed by (CS Operations Personnel):

_____ _____
(printed name) (signature)

This Permit to be kept at job site. Return job site copy to safety office following job completion.

Copies: (1) Safety office, (1) Unit Supervisor, (1) Job Site

PERMIT VALID FOR 8 HOURS ONLY. Adopted from 29 CFR 1919.146 dated 29 June 1993, Appendix D-2

DATE: SITE LOCATION/DESCRIPTION

PURPOSE OF ENTRY

SUPERVISOR(S) in charge of crews	Type of Crew	Phone number

CREW MEMBERS:(1) (2) list others on reverse

(3) (4)

COMMUNICATION PROCEDURES

RESCUE PROCEDURES:(PHONE NUMBERS AT BOTTOM)

*** BOLD DENOTES MINIMUM REQUIREMENTS TO BE COMPLETED AND REVIEWED PRIOR TO ENTRY ***

REQUIREMENTS COMPLETED	DATE	TIME	REQUIREMENTS COMPLETED	DATE	TIME
Lock Out/De-energise/Try-out			**Full Body Harness w/"D" ring**		
Line(s) Broken-Capped-Blank			**Emergency Escape Retrieval Eq**		
Purge-Flush and Vent			**Lifelines**		
Ventilation			Fire extinguishers		
Secure Area (Post and Flag)			Lighting (Explosive Proof)		
Breathing Apparatus			Protective Clothing		
Resuscitator - Inhalator			Respirator(s) (Air Purifying)		
Standby Safety Personnel			Burning and Welding Permit		

Note: Items that do not apply enter N/A in the blank.

** RECORD CONTINUOUS MONITORING RESULTS EVERY 2 HOURS **

CONTINUOUS MONITORING**	Permissible
TESTS TO BE TAKEN	Entry Level
PERCENT OF OXYGEN	**19.5% TO 23.5%**
LOWER FLAMMABLE LIMIT	**Under 10%**
CARBON MONOXIDE	**+35 PPM**
Aromatic Hydrocarbon	+ 1 PPM * 5PPM
Hydrogen Cyanide	(Skin) * 4PPM
Hydrogen Sulfide	+10 PPM *15PPM
Sulfur Dioxide	+ 2 PPM * 5PPM
Ammonia	*35PPM

* Short term exposure limit: Employee can work in the area up to 15 minutes.

+ 8 hour Time Weighted Average. Employee can work in area 8 hours (longer with respiratory protection).

REMARKS:

GAS TESTER NAME & CHECK #	INSTRUMENT(S) USED	MODEL &/OR TYPE	SERIAL &/OR UNIT #

SAFETY STANDBY PERSON IS REQUIRED FOR ALL CONFINED SPACE WORK

SAFETY STANDBY PERSON(S)	CHECK #	CONFINED SPACE ENTRANT(S)	CHECK #	CONFINED SPACE ENTRANT(S)

SUPERVISOR AUTHORIZATION - ALL CONDITIONS SATISFIED: Y/N DEPARTMENT/PHONE

AMBULANCE # FIRE # SAFETY # GAS COORDINATOR #

Approved By: (Unit Supervisor) _____ (signature)
(printed name)

Reviewed By (CS Operations Personnel) _____ (signature)
(printed name)

Keep permit at job site. Return to safety office after job completion. Copies: (1) Safety office, (1) Unit Supervisor, (1) Job Site

3

SAMPLE COAST GUARD ENTRY PERMIT, EXAMPLE 2

Found in Reports of OSHA Fatality/ Catastrophe Investigations", Washington, D.C., July 1985 (Ex. 13–15).

4. U.S. Department of Labor. Occupational Safety and Health Administration. Directorate of Technical Support. "Selected Occupational Fatalities Related to Fire and/ or Explosion in Confined Work Spaces as Found in Reports of OSHA Fatality/ Catastrophe Investigations", Washington, D.C., April 1982 (Ex. 13–10)

5. OSHA Integrated Management Information System, Fatality/Catastrophe Database. OSHA Office of Management Data Systems

VII. Federalism

This regulation has been reviewed in accordance with Executive Order 12612 regarding Federalism This order requires that agencies, to the extent possible, refrain from limiting state policy options and consult with states prior to taking any action. Agencies may act only when there is clear constitutional authority and the presence of a problem of national scope The order provides for preemption of state law only if there is a clear congressional intent for the Agency to do so. Any such preemption is to be limited to the extent possible.

Section 18 of the Occupational Safety and Health Act of 1970 expresses Congress' clear intent to preempt state laws relating to issues on which Federal OSHA has promulgated occupational safety and health standards. Under the OSH Act, a state can avoid preemption only if it submits, and obtains Federal approval of, a plan for the development of such standards and their enforcement. Occupational safety and health standards developed by such Plan-States must, among other things, be at least as effective in providing safe and healthful employment and places of employment as Federal Standards. Where such standards are applicable to products distributed or used in interstate commerce, they may not unduly burden commerce and must be justified by compelling local conditions (See Section 18(c)(2) of the OSH Act).

This regulation is drafted so that employees in every state would be protected by general, performance-oriented standards. To the extent that there are state or regional peculiarities caused by the terrain, the climate or other factors, states would be able, under the OSH Act, to develop their own state standards to deal with any special problems. And, under the Act, if a state develops an approved state program, it could make additional requirements in its standards. Moreover, the performance nature of this standard, of and by itself, allows for flexibility by states and employers to provide as much safety as possible using varying methods consonant with conditions in each state.

In short, there is a clear national problem related to occupational safety and health concerning entry into confined spaces. Those states which elect to participate under the statute would not be preempted by this regulation and would be able to address special, local conditions within the framework provided by this performance-oriented standard.

OSHA notes that California, Kentucky, Maryland, Michigan, New Jersey, and Virginia currently have regulations dealing with confined space entry. Of these six state regulations, none would be preempted. New Jersey is not a state-plan state, but their confined space standard applies only to public (state and local government) employees. An analysis of state confined space rules and procedures is contained in Section VI, Summary of the Final Regulatory Impact Analysis and Regulatory Flexibility Analysis, earlier in this preamble.

VIII. State Plan States

The 25 states and territories with their own OSHA-approved occupational safety and health plans must adopt a comparable standard within six months of the publication date of this final standard. These 25 states are: Alaska, Arizona, California, Connecticut (for state and local government employees only), Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, New York (for state and local government employees only), North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Virgin Islands, Washington and Wyoming. Until such time as a state standard is promulgated, Federal OSHA will provide interim enforcement assistance, as appropriate, in these states.

List of Subjects In 29 CFR Part 1910

Attendant, Confined Spaces, Entry permit system, Hazardous atmospheres, Hazardous materials, Incorporation by reference, Monitoring, Occupational safety and health, Permits, Personal protective equipment, Rescue equipment, Respiratory protection, Retrieval lines, Safety, Signs, Tags, Tools, Welding.

IX. Authority

This document was prepared under the direction of Dorothy L. Strunk, Acting Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, D.C. 20210.

Accordingly, pursuant to sections 6(b) and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 655, 657), Secretary of Labor's Order No 1–90 (55 FR 9033), and 29 CFR Part 1911, Title 29, Chapter XVII, of the Code of Federal Regulations is amended as follows.

Signed at Washington, D.C., this 6th day of January, 1993.

Dorothy L. Strunk

Acting Assistant Secretary of Labor

PART 1910—OCCUPATIONAL SAFETY AND HEALTH STANDARDS

1 The authority citation for Subpart J of Part 1910 is revised to read as follows

AUTHORITY: Secs 4, 6, and 8, Occupational Safety and Health Act of 1970, 29 USC 653, 655, 657; Secretary of Labor's Order No 12–71 (36 FR 8754), 8–76 (41 FR 25059), 9–83 (48 FR 35736) or 1–90 (55 FR 9033), as applicable.

Sections 1910 141, 1910 142,1910 145, 1910 146, and 1910 147 also issued under 29 CFR Part 1911

2. Section 1910.146 is added to read as follows.

§1910.146 Permit-required confined spaces.

(a) *Scope and application* This section contains requirements for practices and procedures to protect employees in general industry from the hazards of entry into permit-required confined spaces This section does not apply to agriculture, to construction, or to shipyard employment (Parts 1928, 1926, and 1915 of this chapter, respectively).

(b) *Definitions*

Acceptable entry conditions means the conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

Attendant means an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program

Authorized entrant means an employee who is authorized by the employer to enter a permit space.

Blanking or blinding means the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate

Confined space means a space that:

(1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and

(2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and

(3) Is not designed for continuous employee occupancy.

Double block and bleed means the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

Emergency means any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

Engulfment means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entry means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Entry permit (permit) means the written or printed document that is provided by the employer to allow and control entry into a permit space and that contains the information specified in paragraph (f) of this section.

Entry supervisor means the person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.

Note: An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this section for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

(1) Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);

(2) Airborne combustible dust at a concentration that meets or exceeds its LFL;

Note: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52 m) or less.

(3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;

(4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, *Occupational Health and Environmental Control*, or in Subpart Z, *Toxic and Hazardous Substances*, of this part and which could result in employee exposure in excess of its dose or permissible exposure limit;

Note: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.

(5) Any other atmospheric condition that is immediately dangerous to life or health.

Note: For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Material Safety Data Sheets that comply with the Hazard Communication Standard, §1910.1200 of this part, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

Hot work permit means the employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

Immediately dangerous to life or health (IDLH) means any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

Note: Some materials—hydrogen fluoride gas and cadmium vapor, for example—may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12–72 hours after exposure. The victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

Inerting means the displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

Note: This procedure produces an IDLH oxygen-deficient atmosphere.

Isolation means the process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

Line breaking means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

Non-permit confined space means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

Oxygen deficient atmosphere means an atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen enriched atmosphere means an atmosphere containing more than 23.5 percent oxygen by volume.

Permit-required confined space (permit space) means a confined space that has one or more of the following characteristics:

(1) Contains or has a potential to contain a hazardous atmosphere;

(2) Contains a material that has the potential for engulfing an entrant;

(3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or

(4) Contains any other recognized serious safety or health hazard.

Permit-required confined space program (permit space program) means the employer's overall program for controlling, and, where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces.

Permit system means the employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

Prohibited condition means any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

Rescue service means the personnel designated to rescue employees from permit spaces.

Retrieval system means the equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

Testing means the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

Note: Testing enables employers both to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to, and during, entry.

(c) *General requirements.* (1) The employer shall evaluate the workplace to determine if any spaces are permit-required confined spaces.

Note: Proper application of the decision flow chart in Appendix A to §1910.146 would facilitate compliance with this requirement.

(2) If the workplace contains permit spaces, the employer shall inform exposed employees, by posting danger signs or by any other equally effective means, of the existence and location of and the danger posed by the permit spaces.

Note: A sign reading "DANGER—PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" or using other similar language would satisfy the requirement for a sign.

(3) If the employer decides that its employees will not enter permit spaces, the employer shall take effective measures to prevent its employees from entering the permit spaces and shall comply with paragraphs (c)(1), (c)(2), (c)(6), and (c)(8) of this section.

(4) If the employer decides that its employees will enter permit spaces, the employer shall develop and implement a written permit space entry program that complies with this section. The written program shall be available for inspection by employees and their authorized representatives.

(5) An employer may use the alternate procedures specified in paragraph (c)(5)(ii) of this section for entering a permit space under the conditions set forth in paragraph (c)(5)(i) of this section.

(i) An employer whose employees enter a permit space need not comply with paragraphs (d) through (f) and (h) through (k) of this section, provided that:

(A) The employer can demonstrate that the only hazard posed by the permit space is an actual or potential hazardous atmosphere;

(B) The employer can demonstrate that continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry;

(C) The employer develops monitoring and inspection data that supports the demonstrations required by paragraphs (c)(5)(i)(A) and (c)(5)(i)(B) of this section;

(D) If an initial entry of the permit space is necessary to obtain the data required by paragraph (c)(5)(i)(C) of this section, the entry is performed in compliance with paragraphs (d) through (k) of this section;

(E) The determinations and supporting data required by paragraphs (c)(5)(i)(A), (c)(5)(i)(B), and (c)(5)(i)(C) of this section are documented by the employer and are made available to each employee who enters the permit space under the terms of paragraph (c)(5) of this section; and

(F) Entry into the permit space under the terms of paragraph (c)(5)(i) of this section is performed in accordance with the requirements of paragraph (c)(5)(ii) of this section.

Note: See paragraph (c)(7) of this section for reclassification of a permit space after all hazards within the space have been eliminated.

(ii) The following requirements apply to entry into permit spaces that meet the conditions set forth in paragraph (c)(5)(i) of this section.

(A) Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.

(B) When entrance covers are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space from foreign objects entering the space.

(C) Before an employee enters the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for the following conditions in the order given:

(*1*) Oxygen content,

(*2*) Flammable gases and vapors, and

(*3*) Potential toxic air contaminants.

(D) There may be no hazardous atmosphere within the space whenever any employee is inside the space.

(E) Continuous forced air ventilation shall be used, as follows:

(*1*) An employee may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere;

(*2*) The forced air ventilation shall be so directed as to ventilate the immediate areas where an employee is or will be present within the space and shall continue until all employees have left the space;

(*3*) The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space.

(F) The atmosphere within the space shall be periodically tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere.

(G) If a hazardous atmosphere is detected during entry:

(*1*) Each employee shall leave the space immediately;

(*2*) The space shall be evaluated to determine how the hazardous atmosphere developed; and

(*3*) Measures shall be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.

(H) The employer shall verify that the space is safe for entry and that the measures required by paragraph (c)(5)(ii) of this section have been taken, through a written certification that contains the date, the location of the space, and the signature of the person providing the certification. The certification shall be made before entry and shall be made available to each employee entering the space.

(6) When there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrants, the employer shall reevaluate that space and, if necessary, reclassify it as a permit-required confined space.

(7) A space classified by the employer as a permit-required confined space may be reclassified as a non-permit confined space under the following procedures:

(i) If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space, the permit space may be reclassified as a non-permit confined space for as long as the non-atmospheric hazards remain eliminated.

(ii) If it is necessary to enter the permit space to eliminate hazards, such entry shall be performed under paragraphs (d) through (k) of this section. If testing and inspection during that entry demonstrate that the hazards within the permit space have been eliminated, the permit space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated.

Note: Control of atmospheric hazards through forced air ventilation does not constitute elimination of the hazards. Paragraph (c)(5) covers permit space entry where the employer can demonstrate that forced air ventilation alone will control all hazards in the space.

(iii) The employer shall document the basis for determining that all hazards in a permit space have been eliminated, through a certification that contains the date, the location of the space, and the signature of the person making the determination. The certification shall be made available to each employee entering the space.

(iv) If hazards arise within a permit space that has been declassified to a non-permit space under paragraph (c)(7) of this section, each employee in the space shall exit the space. The employer shall then reevaluate the space and determine whether it must be reclassified as a permit space, in accordance with other applicable provisions of this section.

(8) When an employer (host employer) arranges to have employees of another employer (contractor) perform work that involves permit space entry, the host employer shall:

(i) Inform the contractor that the workplace contains permit spaces and that permit space entry is allowed only through compliance with an permit space program meeting the requirements of this section;

(ii) Apprise the contractor of the elements, including the hazards identified and the host employer's experience with the space, that make the space in question a permit space;

(iii) Apprise the contractor of any precautions or procedures that the host employer has implemented for the protection of employees in or near permit spaces where contractor personnel will be working;

(iv) Coordinate entry operations with the contractor, when both host employer personnel and contractor personnel will be working in or near permit spaces, as required by paragraph (d)(11) of this section; and

(v) Debrief the contractor at the conclusion of the entry operations regarding the permit space program followed and regarding any hazards confronted or created in permit spaces during entry operations.

(9) In addition to complying with the permit space requirements that apply to all employers, each contractor who is retained to perform permit space entry operations shall:

(i) Obtain any available information regarding permit space hazards and entry operations from the host employer;

(ii) Coordinate entry operations with the host employer, when both host employer personnel and contractor personnel will be working in or near permit spaces, as required by paragraph (d)(11) of this section; and

(iii) Inform the host employer of the permit space program that the contractor will follow and of any hazards confronted or created in permit spaces, either through a debriefing or during the entry operation.

(d) *Permit-required confined space program.* Under the permit-required confined space program required by paragraph (c)(4) of this section, the employer shall:

(1) Implement the measures necessary to prevent unauthorized entry;

(2) Identify and evaluate the hazards of permit spaces before employees enter them;

(3) Develop and implement the means, procedures, and practices necessary for safe permit space entry operations, including, but not limited to, the following:

(i) Specifying acceptable entry conditions;

(ii) Isolating the permit space;

(iii) Purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards;

(iv) Providing pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards; and

(v) Verifying that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.

(4) Provide the following equipment (specified in paragraphs (d)(4)(i) through (d)(4)(ix) of this section) at no cost to employees, maintain that equipment properly, and ensure that employees use that equipment properly:

(i) Testing and monitoring equipment needed to comply with paragraph (d)(5) of this section;

(ii) Ventilating equipment needed to obtain acceptable entry conditions;

(iii) Communications equipment necessary for compliance with paragraphs (h)(3) and (i)(5) of this section;

(iv) Personal protective equipment insofar as feasible engineering and work practice controls do not adequately protect employees;

(v) Lighting equipment needed to enable employees to see well enough to work safely and to exit the space quickly in an emergency;

(vi) Barriers and shields as required by paragraph (d)(3)(iv) of this section;

(vii) Equipment, such as ladders, needed for safe ingress and egress by authorized entrants;

(viii) Rescue and emergency equipment needed to comply with paragraph (d)(9) of this section, except to the extent that the equipment is provided by rescue services; and

(ix) Any other equipment necessary for safe entry into and rescue from permit spaces.

(5) Evaluate permit space conditions as follows when entry operations are conducted:

(i) Test conditions in the permit space to determine if acceptable entry conditions exist before entry is authorized to begin, except that, if isolation of the space is infeasible because the space is large or is part of a continuous system (such as a sewer), pre-entry testing shall be performed to the extent feasible before entry is authorized and, if entry is authorized, entry conditions shall be continuously monitored in the areas where authorized entrants are working;

(ii) Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations; and

(iii) When testing for atmospheric hazards, test first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors.

Note: Atmospheric testing conducted in accordance with Appendix B to §1910.146 would be considered as satisfying the requirements of this paragraph. For permit space operations in sewers, atmospheric testing conducted in accordance with Appendix B, as supplemented by Appendix E to §1910.146, would be considered as satisfying the requirements of this paragraph.

(6) Provide at least one attendant outside the permit space into which entry is authorized for the duration of entry operations;

Note: Attendants may be assigned to monitor more than one permit space provided the duties described in paragraph (i) of this section can be effectively performed for each permit space that is monitored. Likewise, attendants may be stationed at any location outside the permit space to be monitored as long as the duties described in paragraph (i) of this section can be effectively performed for each permit space that is monitored.

(7) If multiple spaces are to be monitored by a single attendant, include in the permit program the means and procedures to enable the attendant to respond to an emergency affecting one or more of the permit spaces being monitored without distraction from the attendant's responsibilities under paragraph (i) of this section;

(8) Designate the persons who are to have active roles (as, for example, authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in a permit space) in entry operations, identify the duties of each such employee, and provide each such employee with the

training required by paragraph (g) of this section;

(9) Develop and implement procedures for summoning rescue and emergency services, for rescuing entrants from permit spaces, for providing necessary emergency services to rescued employees, and for preventing unauthorized personnel from attempting a rescue;

(10) Develop and implement a system for the preparation, issuance, use, and cancellation of entry permits as required by this section;

(11) Develop and implement procedures to coordinate entry operations when employees of more than one employer are working simultaneously as authorized entrants in a permit space, so that employees of one employer do not endanger the employees of any other employer;

(12) Develop and implement procedures (such as closing off a permit space and canceling the permit) necessary for concluding the entry after entry operations have been completed;

(13) Review entry operations when the employer has reason to believe that the measures taken under the permit space program may not protect employees and revise the program to correct deficiencies found to exist before subsequent entries are authorized; and

Note: Examples of circumstances requiring the review of the permit-required confined space program are: any unauthorized entry of a permit space, the detection of a permit space hazard not covered by the permit, the detection of a condition prohibited by the permit, the occurrence of an injury or near-miss during entry, a change in the use or configuration of a permit space, and employee complaints about the effectiveness of the program.

(14) Review the permit-required confined space program, using the canceled permits retained under paragraph (e)(6) of this section within 1 year after each entry and revise the program as necessary, to ensure that employees participating in entry operations are protected from permit space hazards.

Note: Employers may perform a single annual review covering all entries performed during a 12-month period. If no entry is performed during a 12-month period, no review is necessary.

Appendix C to §1910.146 presents examples of permit entry programs that are considered to comply with the requirements of paragraph (d) of this section.

(e) *Permit system.* (1) Before entry is authorized, the employer shall document the completion of measures required by paragraph (d)(3) of this section by preparing an entry permit.

Note: Appendix D to §1910.146 presents examples of permits whose elements are considered to comply with the requirements of this section.

(2) Before entry begins, the entry supervisor identified on the permit shall sign the entry permit to authorize entry.

(3) The completed permit shall be made available at the time of entry to all authorized entrants, by posting it at the entry portal or by any other equally effective means, so that the entrants can confirm that pre-entry preparations have been completed.

(4) The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit in accordance with paragraph (f)(2) of this section.

(5) The entry supervisor shall terminate entry and cancel the entry permit when:

(i) The entry operations covered by the entry permit have been completed; or

(ii) A condition that is not allowed under the entry permit arises in or near the permit space.

(6) The employer shall retain each canceled entry permit for at least 1 year to facilitate the review of the permit-required confined space program required by paragraph (d)(14) of this section. Any problems encountered during an entry operation shall be noted on the pertinent permit so that appropriate revisions to the permit space program can be made.

(f) *Entry permit.* The entry permit that documents compliance with this section and authorizes entry to a permit space shall identify:

(1) The permit space to be entered;

(2) The purpose of the entry;

(3) The date and the authorized duration of the entry permit;

(4) The authorized entrants within the permit space, by name or by such other means (for example, through the use of rosters or tracking systems) as will enable the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrants are inside the permit space;

Note: This requirement may be met by inserting a reference on the entry permit as to the means used, such as a roster or tracking system, to keep track of the authorized entrants within the permit space.

(5) The personnel, by name, currently serving as attendants;

(6) The individual, by name, currently serving as entry supervisor, with a space for the signature or initials of the entry supervisor who originally authorized entry;

(7) The hazards of the permit space to be entered;

(8) The measures used to isolate the permit space and to eliminate or control permit space hazards before entry;

Note: Those measures can include the lockout or tagging of equipment and procedures for purging, inerting, ventilating, and flushing permit spaces.

(9) The acceptable entry conditions;

(10) The results of initial and periodic tests performed under paragraph (d)(5) of this section, accompanied by the names or initials of the testers and by an indication of when the tests were performed;

(11) The rescue and emergency services that can be summoned and the means (such as the equipment to use and the numbers to call) for summoning those services;

(12) The communication procedures used by authorized entrants and attendants to maintain contact during the entry;

(13) Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment, to be provided for compliance with this section;

(14) Any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety; and

(15) Any additional permits, such as for hot work, that have been issued to authorize work in the permit space.

(g) *Training.* (1) The employer shall provide training so that all employees whose work is regulated by this section acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this section.

(2) Training shall be provided to each affected employee:

(i) Before the employee is first assigned duties under this section;

(ii) Before there is a change in assigned duties;

(iii) Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained;

(iv) Whenever the employer has reason to believe either that there are deviations from the permit space entry procedures required by paragraph (d)(3) of this section or that there are inadequacies in the employee's knowledge or use of these procedures.

(3) The training shall establish employee proficiency in the duties required by this section and shall introduce new or revised procedures, as necessary, for compliance with this section.

(4) The employer shall certify that the training required by paragraphs (g)(1)

through (g)(3) of this section has been accomplished. The certification shall contain each employee's name, the signatures or initials of the trainers, and the dates of training. The certification shall be available for inspection by employees and their authorized representatives.

(h) *Duties of authorized entrants.* The employer shall ensure that all authorized entrants:

(1) Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

(2) Properly use equipment as required by paragraph (d)(4) of this section;

(3) Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space as required by paragraph (i)(6) of this section;

(4) Alert the attendant whenever:

(i) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or

(ii) The entrant detects a prohibited condition; and

(5) Exit from the permit space as quickly as possible whenever:

(i) An order to evacuate is given by the attendant or the entry supervisor,

(ii) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation,

(iii) The entrant detects a prohibited condition, or

(iv) An evacuation alarm is activated.

(i) *Duties of attendants.* The employer shall ensure that each attendant:

(1) Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

(2) Is aware of possible behavioral effects of hazard exposure in authorized entrants;

(3) Continuously maintains an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants under paragraph (f)(4) of this section accurately identifies who is in the permit space;

(4) Remains outside the permit space during entry operations until relieved by another attendant;

Note: When the employer's permit entry program allows attendant entry for rescue, attendants may enter a permit space to attempt a rescue if they have been trained and equipped for rescue operations as required by paragraph (k)(1) of this section and if they have been relieved as required by paragraph (i)(4) of this section.

(5) Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space under paragraph (i)(6) of this section;

(6) Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions;

(i) If the attendant detects a prohibited condition;

(ii) If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;

(iii) If the attendant detects a situation outside the space that could endanger the authorized entrants; or

(iv) If the attendant cannot effectively and safely perform all the duties required under paragraph (i) of this section;

(7) Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards;

(8) Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:

(i) Warn the unauthorized persons that they must stay away from the permit space;

(ii) Advise the unauthorized persons that they must exit immediately if they have entered the permit space and

(iii) Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;

(9) Performs non-entry rescues as specified by the employer's rescue procedure; and

(10) Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

(j) *Duties of entry supervisors.* The employer shall ensure that each entry supervisor:

(1) Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

(2) Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;

(3) Terminates the entry and cancels the permit as required by paragraph (e)(5) of this section;

(4) Verifies that rescue services are available and that the means for summoning them are operable;

(5) Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations; and

(6) Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

(k) *Rescue and emergency services.* (1) The following requirements apply to employers who have employees enter permit spaces to perform rescue services.

(i) The employer shall ensure that each member of the rescue service is provided with, and is trained to use properly, the personal protective equipment and rescue equipment necessary for making rescues from permit spaces.

(ii) Each member of the rescue service shall be trained to perform the assigned rescue duties. Each member of the rescue service shall also receive the training required of authorized entrants under paragraph (g) of this section.

(iii) Each member of the rescue service shall practice making permit space rescues at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit spaces or from representative permit spaces. Representative permit spaces shall, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.

(iv) Each member of the rescue service shall be trained in basic first-aid and in cardiopulmonary resuscitation (CPR). At least one member of the rescue service holding current certification in first aid and in CPR shall be available.

(2) When an employer (host employer) arranges to have persons other than the host employer's employees perform permit space rescue, the host employer shall:

(i) Inform the rescue service of the hazards they may confront when called on to perform rescue at the host employer's facility, and

(ii) Provide the rescue service with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.

(3) To facilitate non-entry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant.

Federal Register--Rules and Regulations Cont'd

Retrieval systems shall meet the following requirements.

(i) Each authorized entrant shall use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, or above the entrant's head. Wristlets may be used in lieu of the chest or full body harness if the employer can demonstrate that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative.

(ii) The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve personnel from vertical type permit spaces more than 5 feet deep.

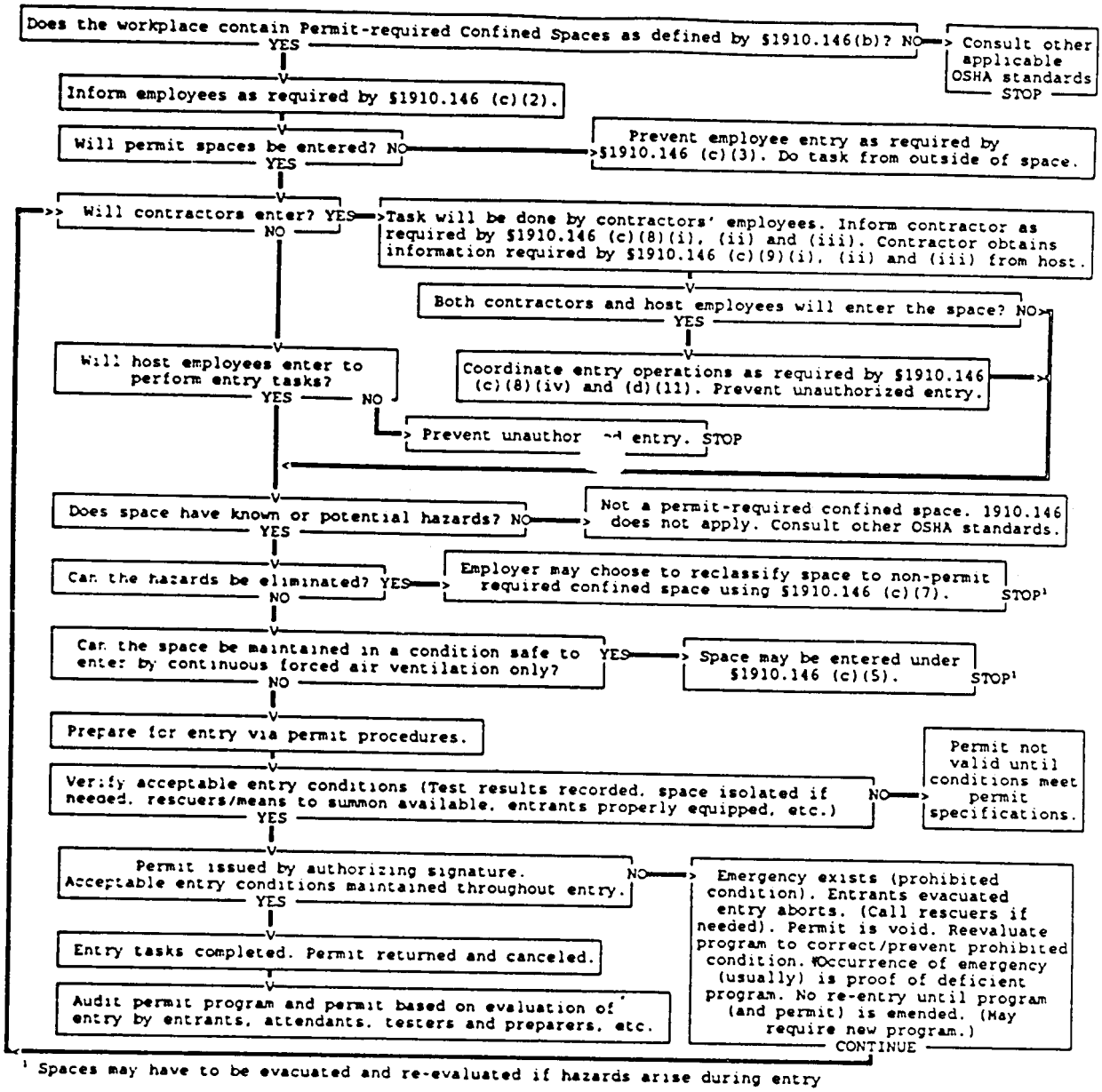
(4) If an injured entrant is exposed to a substance for which a Material Safety Data Sheet (MSDS) or other similar written information is required to be kept at the worksite, that MSDS or written information shall be made available to the medical facility treating the exposed entrant.

APPENDICES TO §1910.146—PERMIT-REQUIRED CONFINED SPACES

Note: Appendices A through E serve to provide information and non-mandatory guidelines to assist employers and employees in complying with the appropriate requirements of this section.

Appendix A

Permit-required Confined Space Decision Flow Chart



[1] Spaces may have to be evacuated and re-evaluated if hazards arise during entry

Appendix B to §1910.146—Procedures for Atmospheric Testing

Atmospheric testing is required for two distinct purposes: evqaluation of the hazards of the permit space and verification that acceptable entry conditions for entry into that space exist.

(1) *Evaluation testing.* The atmosphere of a confined space should be analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate any hazardous atmospheres that may exist or arise, so that appropriate permit entry procedures can be developed and acceptable entry conditions stipulated for that space. Evaluation and interpretation of these data, and development of the entry procedure, should be done by, or reviewed by, a technically qualified professional (e.g., OSHA consultation service, or certified industrial hygienist, registered safety engineer, certified safety professional, etc.) based on evaluation of all serious hazards.

(2) *Verification testing.* The atmosphere of a permit space which may contain a hazardous atmosphere should be tested for residues of all contaminants identified by evaluation testing using permit specified equipment to determine that residual concentrations at the time of testing and entry are within the range of acceptable entry conditions. Results of testing (i.e., actual concentration, etc.) should be recorded on the permit in the space provided adjacent to the stipulated acceptable entry condition.

(3) *Duration of testing.* Measurement of values for each atmospheric parameter should be made for at least the minimum response time of the test instrument specified by the manufacturer.

(4) *Testing stratified atmospheres.* When monitoring for entries involving a descent into atmospheres that may be stratified, the atmospheric envelope should be tested a distance of approximately 4 feet (1.22 m) in the direction of travel and to each side. If a sampling probe is used, the entrant's rate of progress should be slowed to accommodate the sampling speed and detector response.

Appendix C to §1910.146—Examples of Permit-required Confined Space Programs

Example 1.

Workplace. Sewer entry.

Potential hazards. The employees could be exposed to the following:

Engulfment.

Presence of toxic gases. Equal to or more than 10 ppm hydrogen sulfide. If the presence of other toxic contaminants is suspected, specific monitoring programs will be developed.

Presence of explosive/flammable gases. Equal to or greater than 10% of the lower flammable limit (LFL).

Oxygen Deficiency. A concentration of oxygen in the atmosphere equal to or less than 19.5% by volume.

A. *Entry Without Permit/Attendant*

Certification. Confined spaces may be entered without the need for a written permit or attendant provided that: 1.) the space is determined *not* to be a permit required confined space, or 2.) the space can be maintained in a safe condition for entry by mechanical ventilation alone. All spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. Any employee required or permitted to pre-check or enter an enclosed/confined space shall have successfully completed, as a minimum, the training as required by the following sections of these procedures. *A written copy of operating and rescue procedures as required by these procedures shall be at the work site for the duration of the job.* The Confined Space Pre-Entry Check List must be completed by the LEAD WORKER before entry into a confined space. This list verifies completion of items listed below. This check list shall be kept at the job site for duration of the job. If circumstances dictate an interruption in the work, the permit space must be re-evaluated and a new check list must be completed.

Control of atmospheric and engulfment hazards.

Pumps and Lines. All pumps and lines which may reasonably cause contaminants to flow into the space shall be disconnected, blinded and locked out, or effectively isolated by other means to prevent development of dangerous air contamination or engulfment. Not all laterals to sewers or storm drains require blocking. However, where experience or knowledge of industrial use indicates there is a reasonable potential for contamination of air or engulfment into an occupied sewer, then all affected laterals shall be blocked. If blocking and/or isolation requires entry into the space the provisions for entry into a permit- required confined space must be implemented.

Surveillance. The surrounding area shall be surveyed to avoid hazards such as drifting vapors from the tanks, piping, or sewers.

Testing. The atmosphere within the space will be tested to determine whether dangerous air contamination and/or oxygen deficiency exists. An alarm only type gas monitor may be used. Testing shall be performed by the LEAD WORKER who has successfully completed the Gas Detector training for the monitor he will use. The minimum parameters to be monitored are oxygen deficiency, LFL, and hydrogen sulfide concentration. A written record of the pre-entry test results shall be made and kept at the work site for the duration of the job. The supervisor will certify in writing, based upon the results of the pre-entry testing, that all hazards have been eliminated. Affected employees shall be able to review the testing results. The most hazardous conditions shall govern when work is being performed in two adjoining, connecting spaces.

Entry Procedures. If there are no non-atmospheric hazards present and if the pre-entry tests show there is no dangerous air contamination and/or oxygen deficiency within the space and there is no reason to believe that any is likely to develop, entry into and work within may proceed. Continuous testing of the atmosphere in the immediate vicinity of the workers within the space shall be accomplished. The workers will immediately leave the permit space when any of the gas monitor alarm set points are reached as defined. Workers will not return to the area until a SUPERVISOR who has completed the gas detector training has used a direct reading gas detector to evaluate the situation and has determined that it is safe to enter.

Rescue. Arrangements for rescue services are not required where there is no attendant. See the rescue portion of section B., below, for instructions regarding rescue planning where an entry permit is required.

B. *Entry Permit Required*

Permits. Confined Space Entry Permit. All spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. Any employee required or permitted to pre-check or enter a permit-required confined space shall have successfully completed, as a minimum, the training as required by the following sections of these procedures. *A written copy of operating and rescue procedures as required by these procedures shall be at the work site for the duration of the job.* The Confined Space Entry Permit must be completed before approval can be given to enter a permit-required confined space. This permit verifies completion of items listed below. This permit shall be kept at the job site for the duration of the job. If circumstances cause an interruption in the work or a change in the alarm conditions for which entry was approved, a new Confined Space Entry Permit must be completed.

Control of atmospheric and engulfment hazards.

Surveillance. The surrounding area shall be surveyed to avoid hazards such as drifting vapors from tanks, piping or sewers.

Testing. The confined space atmosphere shall be tested to determine whether dangerous air contamination and/or oxygen deficiency exists. A direct reading gas monitor shall be used. Testing shall be performed by the SUPERVISOR who has successfully completed the gas detector training for the monitor he will use. The minimum parameters to be monitored are oxygen deficiency, LFL and hydrogen sulfide concentration. A written record of the pre-entry test results shall be made and kept at the work site for the duration of the job. Affected employees shall be able to review the testing results. The most hazardous conditions shall govern when work is being performed in two adjoining, connected spaces.

Space Ventilation. Mechanical ventilation systems, where applicable, shall be set at 100% outside air. Where possible, open additional manholes to increase air circulation. Use portable blowers to augment natural circulation if needed. After a suitable ventilating period, repeat the testing. Entry may not begin until testing has demonstrated that the hazardous atmosphere has been eliminated.

Entry Procedures. The following procedure shall be observed under any of the following conditions: 1.) Testing demonstrates the existence of dangerous or deficient conditions and additional ventilation cannot reduce concentrations to safe levels; 2.) The atmosphere tests as safe but unsafe

conditions can reasonably be expected to develop; 3.) It is not feasible to provide for ready exit from spaces equipped with automatic fire suppression systems and it is not practical or safe to deactivate such systems; or 4.) An emergency exists and it is not feasible to wait for pre-entry procedures to take effect.

All personnel must be trained. A self contained breathing apparatus shall be worn by any person entering the space. At least one worker shall stand by the outside of the space ready to give assistance in case of emergency. The standby worker shall have a self contained breathing apparatus available for immediate use. There shall be at least one additional worker within sight or call of the standby worker. Continuous powered communications shall be maintained between the worker within the confined space and standby personnel.

If at any time there is any questionable action or non- movement by the worker inside, a verbal check will be made. If there is no response, the worker will be moved immediately. *Exception:* If the worker is disabled due to falling or impact, he/she shall not be removed from the confined space unless there is immediate danger to his/her life. Local fire department rescue personnel shall be notified immediately. The standby worker may only enter the confined space in case of an emergency (wearing the self contained breathing apparatus) and only after being relieved by another worker. Safety belt or harness with attached lifeline shall be used by all workers entering the space with the free end of the line secured outside the entry opening. The standby worker shall attempt to remove a disabled worker via his lifeline before entering the space.

When practical, these spaces shall be entered through side openings—those within 3 1/2 feet (1.07 m) of the bottom. When entry must be through a top opening, the safety belt shall be of the harness type that suspends a person upright and a hoisting device or similar apparatus shall be available for lifting workers out of the space.

In any situation where their use may endanger the worker, use of a hoisting device or safety belt and attached lifeline may be discontinued.

When dangerous air contamination is attributable to flammable and/or explosive substances, lighting and electrical equipment shall be Class 1, Division 1 rated per National Electrical Code and no ignition sources shall be introduced into the area.

Continuous gas monitoring shall be performed during all confined space operations. If alarm conditions change adversely, entry personnel shall exit the confined space and a new confined space permit issued.

Rescue. Call the fire department services for rescue. Where immediate hazards to injured personnel are present, workers at the site shall implement emergency procedures to fit the situation.

Example 2.

Workplace. Meat and poultry rendering plants.

Cookers and dryers are either batch or continuous in their operation. Multiple batch cookers are operated in parallel. When one unit of a multiple set is shut down for repairs, means are available to isolate that unit from the others which remain in operation.

Cookers and dryers are horizontal, cylindrical vessels equipped with a center, rotating shaft and agitator paddles or discs. If the inner shell is jacketed, it is usually heated with steam at pressures up to 150 psig (1034.25 kPa). The rotating shaft assembly of the continuous cooker or dryer is also steam heated.

Potential Hazards. The recognized hazards associated with cookers and dryers are the risk that employees could be:

1. Struck or caught by rotating agitator;
2. Engulfed in raw material or hot, recycled fat;
3. Burned by steam from leaks into the cooker/dryer steam jacket or the condenser duct system if steam valves are not properly closed and locked out;
4. Burned by contact with hot metal surfaces, such as the agitator shaft assembly, or inner shell of the cooker/dryer;
5. Heat stress caused by warm atmosphere inside cooker/dryer;
6. Slipping and falling on grease in the cooker/dryer;
7. Electrically shocked by faulty equipment taken into the cooker/dryer;
8. Burned or overcome by fire or products of combustion; or
9. Overcome by fumes generated by welding or cutting done on grease covered surfaces.

Permits. The supervisor in this case is always present at the cooker/dryer or other permit entry confined space when entry is made. The supervisor must follow the pre-entry isolation procedures described in the entry permit in preparing for entry, and ensure that the protective clothing, ventilating equipment and any other equipment required by the permit are at the entry site.

Control of hazards. Mechanical. Lock out main power switch to agitator motor at main power panel. Affix tag to the lock to inform others that a permit entry confined space entry is in progress.

Engulfment. Close all valves in the raw material blow line. Secure each valve in its closed position using chain and lock. Attach a tag to the valve and chain warning that a permit entry confined space entry is in progress. The same procedure shall be used for securing the fat recycle valve.

Burns and heat stress. Close steam supply valves to jacket and secure with chains and tags. Insert solid blank at flange in cooker vent line to condenser manifold duct system. Vent cooker/dryer by opening access door at discharge end and top center door to allow natural ventilation throughout the entry. If faster cooling is needed, use an portable ventilation fan to increase ventilation. Cooling water may be circulated through the jacket to reduce both outer and inner surface temperatures of cooker/dryers faster. Check air and inner surface temperatures in cooker/dryer to assure they are within acceptable limits before entering, or use proper protective clothing.

Fire and fume hazards. Careful site preparation, such as cleaning the area within 4 inches (10.16 cm) of all welding or torch cutting operations, and proper ventilation are the preferred controls. All welding and cutting operations shall be done in accordance with the requirements of 29 CFR Part 1910, Subpart Q, OSHA's welding standard. Proper ventilation may be achieved by local exhaust ventilation, or the use of portable ventilation fans, or a combination of the two practices.

Electrical shock. Electrical equipment used in cooker/dryers shall be in serviceable condition.

Slips and falls. Remove residual grease before entering cooker/dryer.

Attendant. The supervisor shall be the attendant for employees entering cooker/dryers.

Permit. The permit shall specify how isolation shall be done and any other preparations needed before making entry. This is especially important in parallel arrangements of cooker/dryers so that the entire operation need not be shut down to allow safe entry into one unit.

Rescue. When necessary, the attendant shall call the fire department as previously arranged.

Example 3.

Workplace. Workplaces where tank cars, trucks, and trailers, dry bulk tanks and trailers, railroad tank cars, and similar portable tanks are fabricated or serviced.

A. *During fabrication.* These tanks and dry-bulk carriers are entered repeatedly throughout the fabrication process. These products are not configured identically, but the manufacturing processes by which they are made are very similar.

Sources of hazards. In addition to the mechanical hazards arising from the risks that an entrant would be injured due to contact with components of the tank or the tools being used, there is also the risk that a worker could be injured by breathing fumes from welding materials or mists or vapors from materials used to coat the tank interior. In addition, many of these vapors and mists are flammable, so the failure to properly ventilate a tank could lead to a fire or explosion.

Control of hazards.

Welding. Local exhaust ventilation shall be used to remove welding fumes once the tank or carrier is completed to the point that workers may enter and exit only through a manhole. (Follow the requirements of 29 CFR 1910, Subpart Q, OSHA's welding standard, at all times) Welding gas tanks may never be brought into a tank or carrier that is a permit entry confined space.

Application of interior coatings/linings. Atmospheric hazards shall be controlled by forced air ventilation sufficient to keep the atmospheric concentration of flammable materials below 10% of the lower flammable limit (LFL) (or lower explosive limit (LEL), whichever term is used locally). The appropriate respirators are provided and shall be used in addition to providing forced ventilation if the forced ventilation does not maintain acceptable respiratory conditions.

Permits. Because of the repetitive nature of the entries in these operations, an "Area

Entry Permit" will be issued for a 1 month period to cover those production areas where tanks are fabricated to the point that entry and exit are made using manholes.

Authorization. Only the area supervisor may authorize an employee to enter a tank within the permit area. The area supervisor must determine that conditions in the tank trailer, dry bulk trailer or truck, etc. meet permit requirements before authorizing entry.

Attendant. The area supervisor shall designate an employee to maintain communication by employer specified means with employees working in tanks to ensure their safety. The attendant may not enter any permit entry confined space to rescue an entrant or for any other reason, unless authorized by the rescue procedure and, and even then, only after calling the rescue team and being relieved by as attendant by another worker.

Communications and observation. Communications between attendant and entrant(s) shall be maintained throughout entry. Methods of communication that may be specified by the permit include voice, voice powered radio, tapping or rapping codes on tank walls, signalling tugs on a rope, and the attendant's observation that work activities such as chipping, grinding, welding, spraying, etc., which require deliberate operator control continue normally. These activities often generate so much noise that the necessary hearing protection makes communication by voice difficult.

Rescue procedures. Acceptable rescue procedures include entry by a team of employee-rescuers, use of public emergency services, and procedures for breaching the tank. The area permit specifies which procedures are available, but the area supervisor makes the final decision based on circumstances. (Certain injuries may make it necessary to breach the tank to remove a person rather than risk additional injury by removal through an existing manhole. However, the supervisor must ensure that no breaching procedure used for rescue would violate terms of the entry permit. For instance, if the tank must be breached by cutting with a torch, the tank surfaces to be cut must be free of volatile or combustible coatings within 4 inches (10.16 cm) of the cutting line and the atmosphere within the tank must be below the LFL.

Retrieval line and harnesses. The retrieval lines and harnesses generally required under this standard are usually impractical for use in tanks because the internal configuration of the tanks and their interior baffles and other structures would prevent rescuers from hauling out injured entrants. However, unless the rescue procedure calls for breaching the tank for rescue, the rescue team shall be trained in the use of retrieval lines and harnesses for removing injured employees through manholes.

B. *Repair or service of "used" tanks and bulk trailers.*

Sources of hazards. In addition to facing the potential hazards encountered in fabrication or manufacturing, tanks or trailers which have been in service may contain residues of dangerous materials, whether left over from the transportation of hazardous cargoes or generated by chemical or bacterial action on residues of non-hazardous cargoes.

Control of atmospheric hazards. A "used" tank shall be brought into areas where tank entry is authorized only after the tank has been emptied, cleansed (without employee entry) of any residues, and purged of any potential atmospheric hazards.

Welding. In addition to tank cleaning for control of atmospheric hazards, coating and surface materials shall be removed 4 inches (10.16 cm) or more from any surface area where welding or other torch work will be done and care taken that the atmosphere within the tank remains well below the LFL. (Follow the requirements of 29 CFR 1910, Subpart Q, OSHA's welding standard, at all times.)

Permits. An entry permit valid for up to 1 year shall be issued prior to authorization of entry into used tank trailers, dry bulk trailers or trucks. In addition to the pre-entry cleaning requirement, this permit shall require the employee safeguards specified for new tank fabrication or construction permit areas.

Authorization. Only the area supervisor may authorize an employee to enter a tank trailer, dry bulk trailer or truck within the permit area. The area supervisor must determine that the entry permit requirements have been met before authorizing entry.

Appendix E to §1910.146—Sewer System Entry

Sewer entry differs in three vital respects from other permit entries; first, there rarely exists any way to completely isolate the space (a section of a continuous system) to be entered; second, because isolation is not complete, the atmosphere may suddenly and unpredictably become lethally hazardous (toxic, flammable or explosive) from causes beyond the control of the entrant or employer, and third, experienced sewer workers are especially knowledgeable in entry and work in their permit spaces because of their frequent entries. Unlike other employments where permit space entry is a rare and exceptional event, sewer workers' usual work environment is a permit space.

(1) *Adherence to procedure.* The employer should designate as entrants only employees who are thoroughly trained in the employer's sewer entry procedures and who demonstrate that they follow these entry procedures exactly as prescribed when performing sewer entries.

(2) *Atmospheric monitoring.* Entrants should be trained in the use of, and be equipped with, atmospheric monitoring equipment which sounds an audible alarm, in addition to its visual readout, whenever one of the following conditions is encountered: oxygen concentration less than 19.5 percent; flammable gas or vapor at 10 percent or more of the lower flammable limit (LFL); or hydrogen sulfide or carbon monoxide at or above their PEL (10 ppm or 50 ppm, respectively); or, if a broad range sensor device is used, at 100 ppm as characterized by its response to toluene. Normally, the oxygen sensor/broad range sensor instrument is best suited for sewer entry. However, substance specific devices should be used whenever actual contaminants have been identified. The instrument should be carried and used by the entrant in sewer line work to monitor the atmosphere in the entrant's environment, and in advance of the entrants' direction of movement, to warn the entrant of any deterioration in atmospheric conditions. Where several entrants are working together in the same immediate location, one instrument, used by the lead entrant, is acceptable.

(3) *Surge flow and flooding.* Sewer crews should develop and maintain liaison, to the extent possible, with the local weather bureau and fire and emergency services in their area so that sewer work may be delayed or interrupted and entrants withdrawn whenever sewer lines might be suddenly flooded by rain or fire suppression activities, or whenever flammable or other hazardous materials are released into sewers during emergencies by industrial or transportation accidents.

(4) *Special Equipment.* Entry into large bore sewers may require the use of special equipment. Such equipment might include such items as atmosphere monitoring devices with automatic audible alarms, escape self-contained breathing apparatus (ESCBA) with at least 10 minute air supply (or other NIOSH approved self-rescuer), and waterproof flashlights, and may also include boats and rafts, radios and rope stand-offs for pulling around bends and corners as needed.

[FR Doc. 93-538 Filed 1-13-1993; 8:45 am]

BILLING CODE 4510-26-

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Part 1910

RIN 1218-AA51

[Docket No. S-019]

Permit-Required Confined Spaces; Correction

AGENCY: Occupational Safety and Health Administration (OSHA), U.S. Department of Labor.

ACTION: Final rule; corrections.

SUMMARY: This document makes corrections to the final rule on Permit-Required Confined Spaces, which was published in the Federal Register on January 14, 1993 at 58 FR 4462.

EFFECTIVE DATE: June 29, 1993.

FOR FURTHER INFORMATION CONTACT: Mr. James F. Foster, Occupational Safety and Health Administration, Office of Information and Public Affairs, room N-3647, U.S. Department of Labor, 200 Constitution Avenue, NW., Washington, DC 20210, Telephone: (202) 219-8151.

SUPPLEMENTARY INFORMATION: This document contains corrections to the final standard for Permit-Required Confined Spaces, which was published on January 14, 1993 (58 FR 4462). As published, the standard and appendices contain typographical errors as well as language that does not clearly express OSHA's intent. As explained below, this document is necessary to correct the identified errors and to indicate clearly what the Agency intended when it promulgated 29 CFR 1910.146.

Amendments to 29 CFR 1910.146

The term "Permit-required confined space program (permit space program)" is defined in 29 CFR 1910.146(b). However, that term is not used consistently elsewhere in the standard. In order to prevent confusion, OSHA is amending the standard so that the defined term appears where appropriate.

Paragraph (c)(5) of the final standard provides for alternative entry procedures to be used by employers under certain specified conditions. Employers meeting the conditions specified in paragraph (c)(5)(i) need not comply with paragraphs (d) through (f) and (h) through (k) of the standard. Paragraph (c)(5)(ii)(H) of the final rule requires that any employer who chooses to make an entry under the provisions of paragraph (c)(5) verify, through a written certification, that the measures required under (c)(5)(ii) have been taken. The certification is required to be made prior to entry. It is clear, however, that some measures (such as periodic monitoring) required under paragraph (c)(5)(ii) cannot be performed before entry takes place and that one cannot provide a pre-entry certification of a post-entry event that has not yet occurred. OSHA is correcting this inconsistency by making it clear that the certification requirement applies only to "pre-entry" measures taken under paragraph (c)(5)(ii).

OSHA recognizes that, while many employers already have fully operative permit space programs that comply with 29 CFR 1910.146, some employers have had little or no experience with such programs. The Agency has included non-mandatory appendices in the final rule for the benefit of those employers who want guidance in developing permit space programs. The appendices simply provide examples of procedures and permit forms that comply with the standard.

Some equipment manufacturers, however, have notified OSHA that certain sections of the appendices need to be amended because they either are unclear or express an inappropriate preference for specific types of equipment and procedures. The Agency has reviewed the manufacturers' concerns and has determined that some provisions of the appendices need to be amended so that they provide clear and appropriate guidance. In addition, OSHA has concluded, based on its own review of the appendices, that some other provisions in the appendices need to be corrected. The changes to the appendices are addressed below.

Amendment to Appendix A

Paragraph (c)(1) of the standard requires that employers evaluate their workplaces to determine if any spaces are permit-required confined spaces. The informational note which follows paragraph (c)(1) of the final standard OSHA states that proper application of the decision flowchart in appendix A of the standard would facilitate compliance with paragraph (c)(1). Several individuals have pointed out to OSHA that appendix A lacks a decision box dealing with the determination of the presence of confined spaces (preliminarily to any determination of whether or not such a confined space was a permit-required confined space). These individuals have recommended that OSHA change appendix A to indicate that such a determination is a necessary part of the evaluation process. OSHA agrees that this correction would be helpful and is adding a decision box at the beginning of appendix A which asks whether or not the workplace contains any confined spaces.

Amendments to Appendix B

OSHA is adding certified marine chemists to the example listing of technically qualified professionals in appendix B, paragraph (1). Certified marine chemists are well qualified to evaluate and interpret confined space hazard data and to develop or review entry procedures. They are an important resource available to employers in all industries.

OSHA is adding paragraph (5) at the end of appendix B to address the order of testing for atmospheric hazards. Even though the order for testing is specifically covered in paragraph (d)(5)(iii) of the standard, OSHA believes it is possible that employers may incorrectly infer from the existing appendix B, which does not address the order of testing, that there is no specified order of testing. The added paragraph briefly explains the correct order of testing and explains why the prescribed order is necessary.

Amendments to Appendix C

OSHA is making several minor changes in Example 1 in appendix C. The phrase "measured as an 8-hour time-weighted average" is being added following "[e]qual to or more than 10 ppm hydrogen sulfide", so that employers will understand precisely what is being measured. The reference to a non permit-required confined space is being removed, since the discussion actually centers on a permit space entry made using the alternative procedures in paragraph (c)(5). OSHA believes that the reference to a non permit-required confined space can only cause confusion, is out of place and should be removed.

Lastly, the reference to an alarm only gas monitor is being corrected. Although the standard contains no requirement that such a meter be used, OSHA feels that an employer could misunderstand the reference and mistakenly believe that an alarm only gas meter is necessary. The Agency expects employers to select the monitoring equipment which fits the circumstances of the particular workplace where entry operations are to be conducted. The alarm only gas monitor was mentioned simply as an example of the monitoring equipment which is available. Therefore, OSHA has added language which clarifies this provision.

Amendments to Appendix D

OSHA is deleting appendix D-1A. It contains material not required by the standard's regulatory text and is called

a "pre-entry check list". It has been the source of considerable confusion among numerous interested persons. OSHA believes that appendix D–1B, by itself, adequately serves as a sample permit and that appendix D–1A is best removed.

OSHA is redesignating appendix D–1B as appendix D–1. Also, all references to the term "check list" are being removed from this appendix, since this term is not used in the regulatory text and may be confusing. OSHA is also adding provisions dealing with communication procedures and periodic testing to appendix D–1. These provisions are required by paragraph (f) of the final rule but were inadvertently omitted from the sample permit in appendix D–1.

OSHA is making several minor changes to appendix D–2. Provisions pertaining to communication procedures, rescue procedures and a space for the name(s) of the entrant(s) have been added, since these items are required by paragraph (f) of the final rule but were inadvertently omitted from the sample permit in appendix D–2.

Amendments to Appendix E

OSHA is removing all references to broad range sensor instruments in appendix E. Employers are given the discretion to select the atmospheric testing equipment that best fits a specific permit space operation, so it is inappropriate for Appendix E to suggest that a particular type of sensor instrument should be used for sewer entry. In keeping with this performance-oriented approach, OSHA has added language to the appendix stating that atmospheric monitoring equipment needs to be calibrated in accordance with the manufacturer's specifications.

Authority: This document was prepared under the direction of David C. Zeigler, Acting Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue, NW., Washington, DC 20210.

Accordingly, the publication on January 14, 1993 of § 1910.146 and appendices thereto, which was the subject of FR Doc. 93–538, is hereby corrected as set forth below.

Signed at Washington, DC, this 23rd day of June, 1993.

David C. Zeigler,

Acting Assistant Secretary of Labor.

§ 1910.146 [Corrected]

1. On page 4551, in the first column, in § 1910.146, the word "entry" is removed from the fourth line of paragraph (c)(4).

§ 1910.146 [Corrected]

2. On page 4551, in the third column, in § 1910.146, the word "pre-entry" is added between the words "the" and "measures" in lines two and three of paragraph (c)(5)(ii)(H).

§ 1910.146 [Corrected]

3. On page 4552, in the first column, in § 1910.146, the phrase "an permit space program" in line four and five of paragraph (c)(8)(i) is corrected to read "a permit space program".

§ 1910.146 [Corrected]

4. On page 4552, in the second column, in § 1910.146, the heading and introductory text to paragraph (d) are corrected to read as follows:

(d) *Permit-required confined space program* (permit space program). Under the permit space program required by paragraph (c)(4) of this section, the employer shall:

* * * * *

§ 1910.146 [Corrected]

5. On page 4553, in the first column, in § 1910.146, the phrase "permit-required confined space program" in lines two and three of the note to paragraph (d)(13) is corrected to read "permit space program."

§ 1910.146 [Corrected]

6. On page 4553, in the first column, in § 1910.146, the phrase "permit-required confined space program" in lines one and two of paragraph (d)(14) is corrected to read "permit space program."

§ 1910.146 [Corrected]

7. On page 4553, in the first column, in § 1910.146, the phrase "permit entry programs" in the second line in the undesignated paragraph following the informational note in paragraph (d)(14) is corrected to read "permit space programs."

Appendices to § 1910.146 [Corrected]

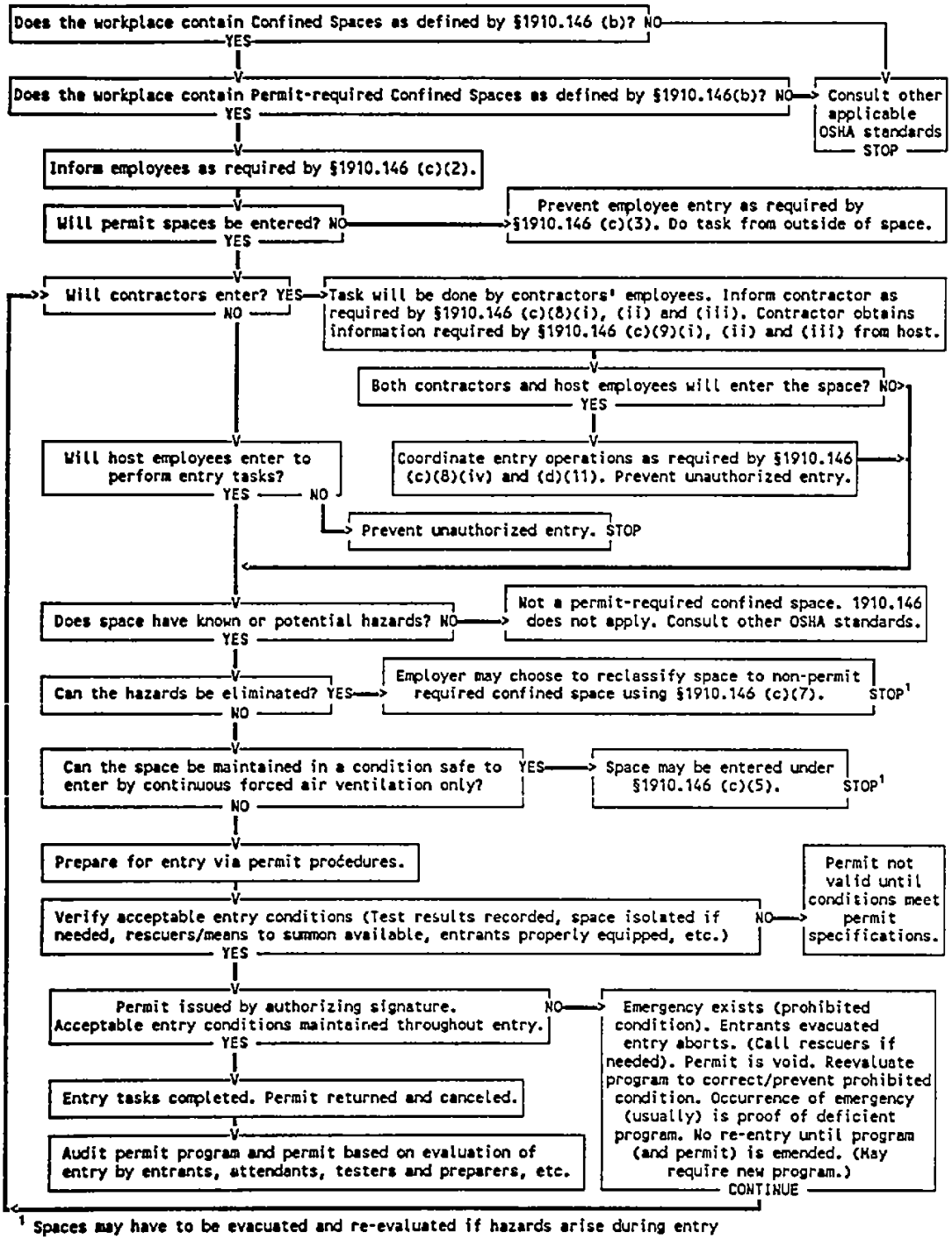
8. Appendix A on page 4556 is corrected by adding a decision box at the beginning of the appendix dealing with the determination of whether or not a workplace contains any confined spaces. The corrected appendix A now reads as follows:

BILLING CODE 4510–26–P

Federal Register--Rules and Regulations Cont'd

Appendix A

Permit-required Confined Space Decision Flow Chart



[1] Spaces may have to be evacuated and re-evaluated if hazards arise during entry

BILLING CODE 4510-26-C

9. On page 4557, in the first column, the word "evqaluation" in the second line of appendix B is corrected to read "evaluation."

10. On page 4557, in the first column, the phrase "certified marine chemist" is added between the words "professional" and "etc." in line fifteen of the *evaluation testing* paragraph of appendix B.

11. On page 4557, in the first column, appendix B is corrected by adding a new paragraph (5) which reads as follows:

(5) *Order of testing.* A test for oxygen is performed first because most combustible gas meters are oxygen dependent and will not provide reliable readings in an oxygen deficient atmosphere. Combustible gases are tested for next because the threat of fire or explosion is both more immediate and more life threatening, in most cases, than exposure to toxic gases and vapors. If tests for toxic gases and vapors are necessary, they are performed last.

12. On page 4557, in the first column, the first sentence of the *Presence of toxic gases* paragraph in Example 1 of appendix C is corrected to read as follows: "Equal to or more than 10 ppm hydrogen sulfide measured as an 8-hour time-weighted average."

13. On page 4557, in the first column, the first sentence under A. *Entry without Permit/Attendant* in Example 1 of appendix C is corrected to read as follows: "Confined spaces may be entered without the need for a written permit or attendant provided that the space can be maintained in a safe condition for entry by mechanical ventilation alone, as provided in § 1910.146(c)(5)."

14. On page 4557, in the second column, the sentence "An alarm only type gas monitor may be used." in the fourth and fifth lines of the *Testing* paragraph, Example 1 of appendix C is corrected to read as follows: "Detector tubes, alarm only gas monitors and explosion meters are examples of monitoring equipment that may be used to test permit space atmospheres."

15. On page 4560 appendix D–1A is removed.

16. On page 4561 appendix D–1B is redesignated as appendix D–1 and is corrected to read as follows:

BILLING CODE 4510-26-P

Federal Register--Rules and Regulations Cont'd

18. On page 4563, in the first and second columns, the *Atmospheric monitoring* paragraph of appendix E is corrected to read as follows "Entrants should be trained in the use of, and be equipped with, atmospheric monitoring equipment which sounds an audible alarm, in addition to its visual readout, whenever one of the following conditions is encountered Oxygen concentration less than 19 5 percent, flammable gas or vapor at 10 percent or more of the lower flammable limit (LFL), or hydrogen sulfide or carbon monoxide at or above 10 ppm or 35 ppm, respectively, measured as an 8 hour time-weighted average Atmospheric monitoring equipment needs to be calibrated according to the manufacturer's instructions. Substance specific monitoring equipment should be used whenever actual or potential contaminants have been identified The instrument should be carried and used by the entrant in sewer line work to monitor the atmosphere in the entrant's environment, and in advance of the entrant's direction of movement, to warn the entrant of any deterioration in atmospheric conditions Where several entrants are working together in the same immediate location, one instrument, used by the lead entrant is acceptable "

[FR Doc. 93–15242 Filed 6–28–93 8 45 am]
BILLING CODE 4510-26-P